



Upscaling proven PET recycling technologies

An overview of EREMA's current portfolio for PET bottle recycling

NPE2024 | MADE FOR YOU
The Plastics Show

Produced by  PLASTICS
INDUSTRY ASSOCIATION

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EREMA Group
May 2024 | NPE, Orlando, USA

Our comprehensive portfolio of plastic recycling solutions for industrialisation

A central graphic features the EREMA group logo, a stylized infinity symbol composed of blue and green lines. Surrounding this central logo are various industrial machines and service icons. The machines include: a large shredder (top left), a long conveyor system (top center), a vertical extruder (top right), a smaller shredder (middle left), a large extruder (middle right), a large conveyor system (bottom right), a smaller extruder (bottom center), and a vertical extruder (bottom left). Service icons include: 'PLANT DESIGN', 'TURNKEY SOLUTIONS', 'REASIBILITY STUDIES', 'ENGINEERING', 'PLANT LOGISTICS', 'PROJECT MANAGEMENT', and 'ONE-STOP SHOP'. A large red arrow points towards the right with the word 'NEW!' written on it.

EREMA

PURE LOOP

PLASMATIC

POWERFIL

KEYCYCLE

3 S

LINDNER WASSTECH

plasticpreneur

UMAC

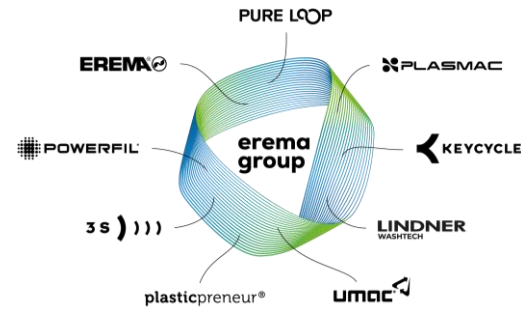
PLANT DESIGN
TURNKEY SOLUTIONS
REASIBILITY STUDIES

ENGINEERING
PLANT LOGISTICS
PROJECT MANAGEMENT
ONE-STOP SHOP

NEW!

EREMA Group

- Turnover EREMA Group: **355 mio. Euro** (fiscal year 2022/23)
- 120 patent families set technological standards
- Approx. **900 employees** worldwide
- **Production capacity delivered** in year **2022/23** over **1.6 million** tonnes per year
- More than **8,000 EREMA systems** in use around the globe
- produce approx. **22 million tons of top-quality plastic pellets** every year
- 100% privately owned (by founder family)



Some statistics from US

1. Of the 40 million tons of plastic waste generated in the U.S. in 2021, **only 5% to 6%** — or about two million tons — **was recycled**.
2. Between 2019 and 2020, there was a **5.7% overall decrease** in plastics recovered for recycling in the U.S. That is the equivalent of 290 million pounds.
- ➔ 3. Approximately **36%** of all plastic produced is used to create **packaging**, 85% of which ends up in landfills.
4. About **98%** of single-use plastic products are made from **fossil fuels**.
- ➔ 5. Globally, we produce about 400 million tons of plastic waste yearly.
6. Until recently, the U.S. outsourced a significant portion of its plastic, but import bans in countries like China and Turkey have fuelled a decline in recycling.
- ➔ 7. The total **bottle** recycling rate for **2022 was 29%**, up from 27.2% in 2020.
- ➔ 8. Every hour, 2.5 million plastic bottles are thrown away in the U.S.
- ➔ 9. Between 75 and 199 million tons of plastic are currently in our oceans.
10. Plastic bottles take upwards of 450 years to degrade.



Food waste generates around **10%** of global greenhouse gas emissions.

(Plastics) packaging protects our food!

Commitments by brands: packaging

huge potential

Food & beverage:

- » **Coca Cola:** 25% by 2025, 50% by 2030
- » **Danone:** 50% by 2025
- » **Diageo:** 40% by 2025
- » **Keurig Dr Pepper:** 25% by 2025
- » **Mars, Inc:** 30% by 2025
- » **Nestlé:** 30% by 2025
- » **PepsiCo:** 25% by 2025



Cleaning, hygiene & personal care:

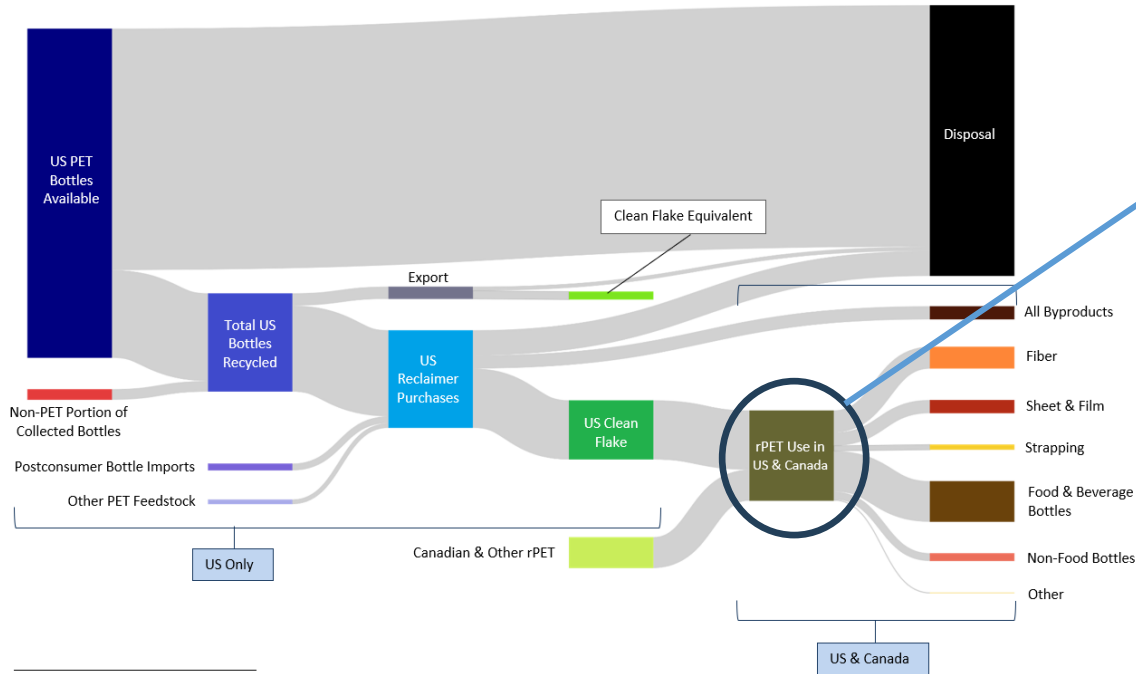
- » **Colgate-Palmolive:** 25% by 2025
- » **Estée Lauder companies:** 75% of all plastics used to be recyclable by 2025; reduce virgin plastic use by 50% or more by 2030
- » **Henkel:** 30% by 2025
- » **L'Oréal:** 50% by 2025
- » **SC Johnson:** 25% by 2025
- » **Unilever:** 25% by 2025



Source: Wood Mackenzie and brands

rPET end use in North America and EREMA's share

graph: courtesy of NAPCOR



Out of **1,754 MMlbs** rPET flakes available in US & Canada

55% EREMA's total share (excl. Fiber)

68% EREMA's total share only in Bottle to Bottle



**“CHANGE IS INEVITABLE.
GROWTH IS OPTIONAL.”**

~ John C. Maxwell

So, **undoubtedly** the **rPET** content will have to **grow** in the next coming years.

Hence, besides **food safety**, **colour stability** and absolute minimum colour deterioration at **feasible prices**, both, for the recycler AND the converter will be THE key topic and focus of converters and brands.

EREMA has the great possibility to serve
all relevant different
technologies
to the market



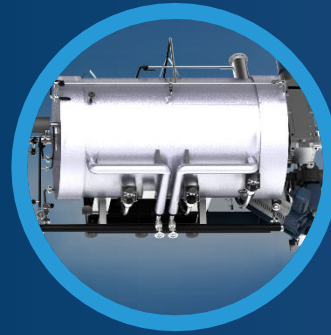
inline



flake
first



pellet
last

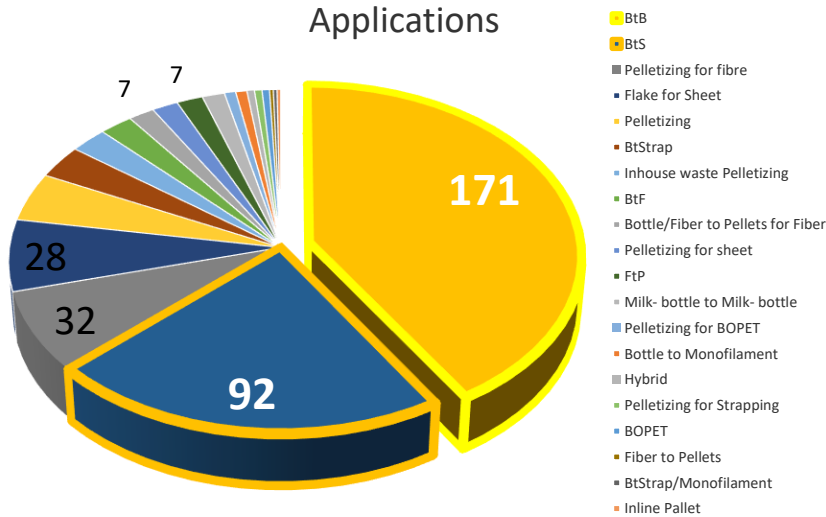


melt
concept



offline

Capacities sold **GLOBALLY** per bottle- sub application



Approx. 416 VACUREMA®
systems sold worldwide.

Almost 4.59 Mio. t/a

Capacity sold worldwide.



Key factors for a successful BtB investment

PET Bottle recycling is like

A, B, C,

It's easy as



1

2

3

Key factors for a successful BtB investment

Perfect colour.

Perfect appearance.

- Vacuum and N₂ „SafeFlake“ **material preparation**
- **Backward degassing** during melting
- **Gentle** plasticising technology / **EcoGentle®**
- **Short dwell time** in the melt

**TOP
COLOUR
PERFORMANCE**



Key factors for a successful BtB investment

Because it's about **your brand.**

- **SafeFlake** technology - **Safe** handling
- Uncompromising **food contact compliance**
- Very high line **availability** of **>8000 hours/year**
- High performance **filtration** → **Clean** clean recycled pellets, clean preforms
- **Leading and proven** system in recycling: hundreds of installations



SAFETY



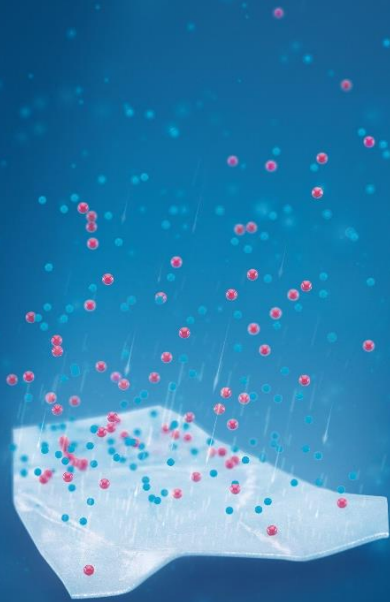
And many **more countries!**



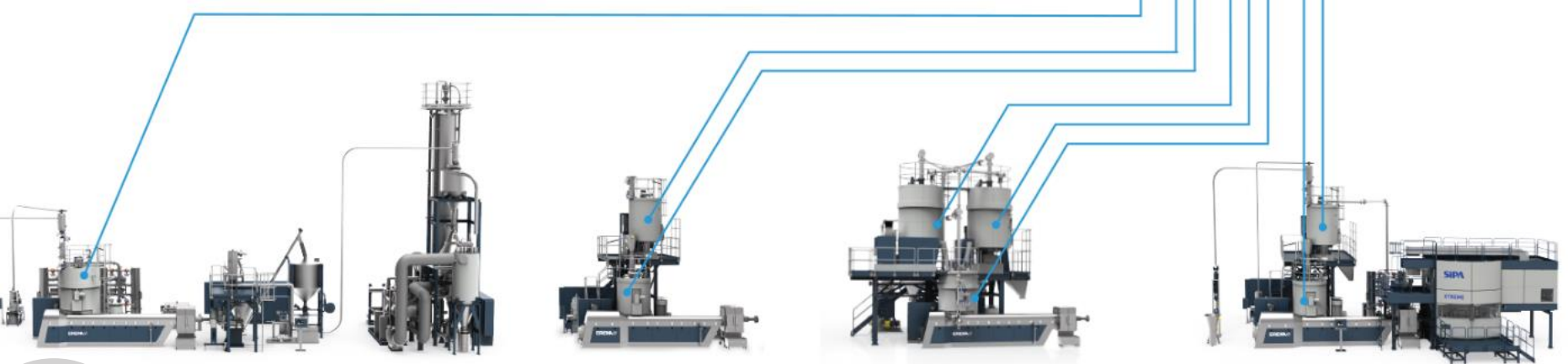
BRAND OWNER APPROVED

SafeFlake

technology



SafeFlake



2

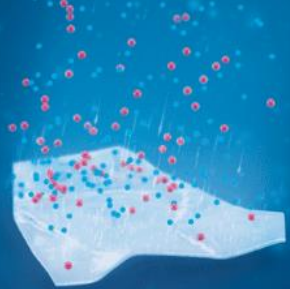
VACUNITE®

VACUREMA® Advanced

VACUREMA® Prime

VACUREMA® Inline Preform

SafeFlake



SafeFlake decontamination
 ensures reliable removal of
 migration substances and moisture
 as well as IV treatment of the PET
 flakes BEFORE extrusion



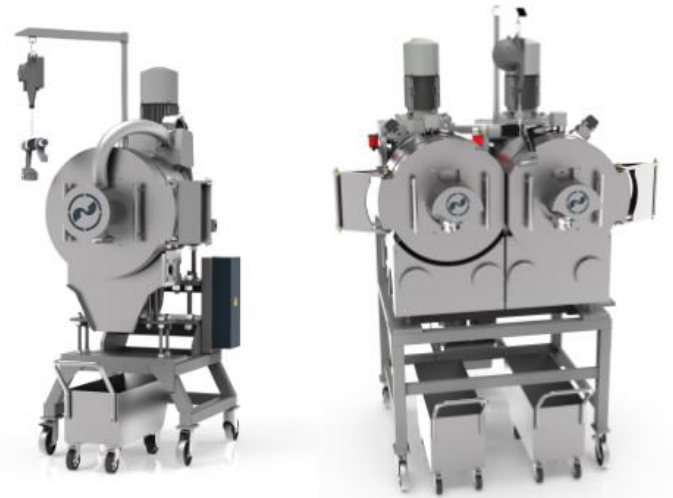
Better melt quality, better end
 product quality



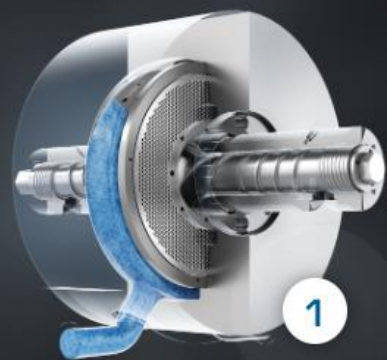
Compensates for different moisture
 and IV values in the input material -
 for more flexibility.



Laserfilter PET Applications



How the Laserfilter works



**Continuous
screen
cleaning**



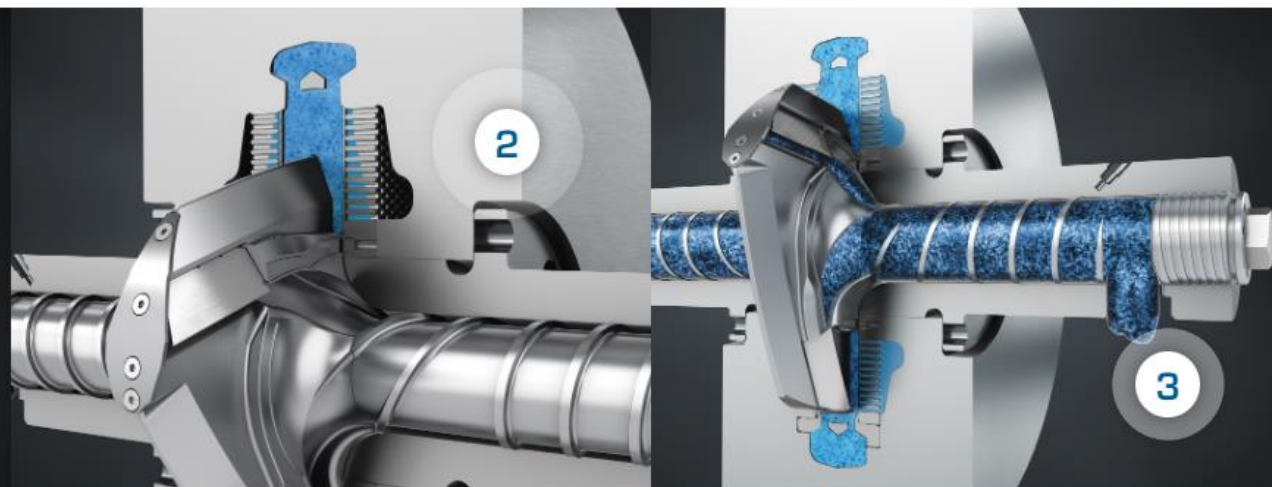
**Constant
pressure
operation**



**What is
clean, stays
clean**



**Extremely
Low Melt
Loss**



Filtration Costs Simulation LF2/406 & SW8/170RTF

Input material: washed bottle flake (EREMA input flake specs)

Laser Filter 2/406

Filtration costs per 1t incl. material loss

= € 10.17



Material costs of 8 screen packages = 21,60€
 (Screen package for single use)
 2 screen changing intervals per day

21,60€ * 2 = 43,20€*

Material costs per day**:

** depending on filter life

*** depending on filter life for 100kg/day in 10h / day



SW8/170RTF

Filtration costs per 1t incl. material loss

= € 33.80

EcoGentle[®]

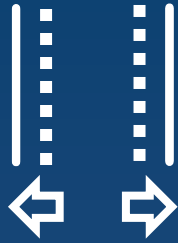
Plasticising technology



Up to

12 %

energy
saving



Extended
process
window

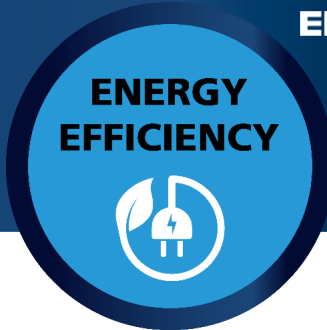


Gentler
material
treatment

3

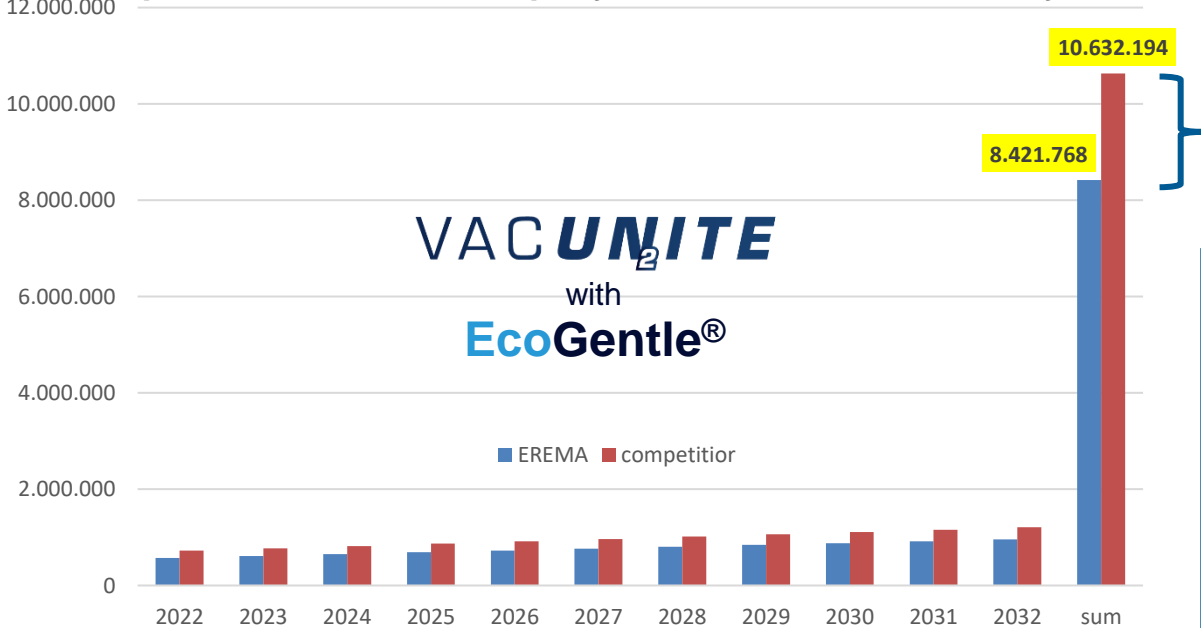


EREMA[®]



Consequence of rising energy prices and the need for energy efficient technologies

power costs difference per year & accumulated for 10 years



VACUNITE₂
with
EcoGentle®

Difference of
2.4 Mio. \$

From flake to pellet:
minus 28%
or
224 t less
CO₂ emissions per year

Key factors for a successful BtB investment

49
times



Big energy savings!

One person can orbit the earth 49 times in an airplane with these energy savings

ENERGY EFFICIENCY



From flake to pellet only
0,32 kWh/kg

minus 28%

or

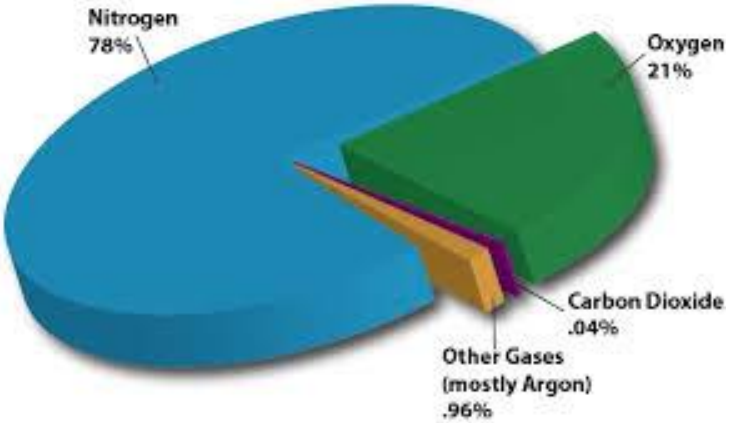
224 t less

CO₂ emissions per year

Consequence of rising utility prices and the need for efficient technologies



What's in the air?

A bar chart with five bars of decreasing height from left to right, colored red, orange, yellow, green, and dark green. A green arrow points from the first bar to the last, indicating a decrease.

N2 consumption reduced by

minus 41%

compared to 1st generation of

VACUNITE₂

Economy of scale

Higher throughput.
Lower OPEX.



- Optimized Extruder and SSP section
- **Optimized OPEX to CAPEX ratio**
- **ONE** contractual partner
- Throughput from 2.200 to **12.100 lbs/hr**



Available demo lines

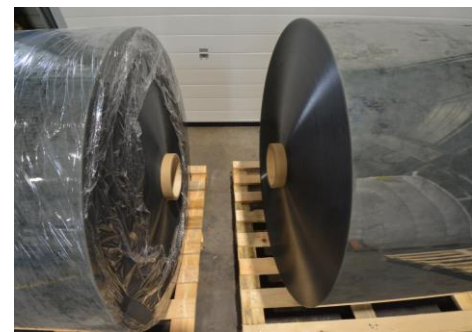
- VACUREMA® Basic, Advanced and Prime in Austria
- MPR in Austria
- VACUNITE® in Austria
- Inline Sheet in Austria
- MPR + SW in **Italy** at AMUT
- Several industrial lines at customers available for site visits



MPR 1700 & SW8/134
for the new demo line in Italy



VACUREMA® BASIC 1714 T for inline production of monolayer sheet
(max 1150mm netto) incl. SML 1100 MONO W1400 in **Ansfelden/Austria**



**TOP
COLOUR
PERFORMANCE**



SAFETY



**ENERGY
EFFICIENCY**



**EREMA
PET recycling
systems – It's easy as**

1

2

3

